UNIVERSITI TEKNOLOGI MARA

DIVERSITY OF ENDOPHYTIC FUNGI ISOLATED FROM ASYMPTOMATIC COCOA POD AND THEIR POTENTIAL AGAINST *Phytophthora palmivora*

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Final year project report submitted in partial fulfilment of the requirement for the degree of
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DECLARATION

This Final Year Project is a partial fulfilment of the requirements for a degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

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ABSTRACT

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The cocoa (*Theobroma cacao L)* is the most important crop in Malaysia, producing an average yield of approximately 9,249 tonnes of cocoa beans and 33.1% of total production. Malaysian Cocoa Board has 13 stations to collect daily prices information: Tawau, Lahad Datu and Tenom in Sabah, Sabak Bernam, Bagan Datoh, Ayer tawar, Batu Pahat, Muar and Jerantut in Peninsular Malaysia and Kuching, Sarikei and Sibu in Sarawak. In Malaysia, the crop is hallowed by being basically disease free, suffering from but one major disease, Black Pod Rot (BPR), caused by *Phytophthora palmivora*. This disease can cause major loss in cocoa production and have a great effect to economic importance to the Malaysian Cocoa industry.

Endophytic fungi are able to play important functions in their plant hosts. The early studies with endophytic fungi were conducted in laboratory by isolating the cocoa pod .The use of endophytic fungi should be preferable as one of biological control agents

as they are internal colonizers that are able to compete with *P. palmivora.* The potential of endophytic fungi colonization for protection against disease has given possibility for research. Understanding the life stage of endophytes can help to design management controlling of BPR. The objectives of this study were, (i) to evaluate the potential of isolate endophytic fungi from asymptomatic cocoa pod and (ii) to determine the potential of endophytic fungi as biological control against *P. palmivora.*

Endophytic fungi were detected and isolated from the pods of cocoa on different areas at different ages. Observations of pod sections under a light microscope showed the presence of fungal endophytes, stained blue with Lactophenol cotton blue (LCB). The fungal cells were observed intra and intercellular in pods from asymptomatic cocoa.There was significant difference between the numbers of Potential Endophytic Fungi found in Malaysian Cocoa Board, Jengka Pahang (MCBJP) with 30% than endophytic isolated from cocoa pod collected from the Malaysian Cocoa Board, Hilir Perak (MCBHP) with 70%. Endophytic fungus more prominent in immature cocoa pods as compared to mature for both collected fungi samples of MCBJP and MCBHP.

The isolated fungi were screened in vitro for their potential properties towards *P. palmivora.* Three fungal endophytes coded as F3, F6 and F20 were shown to have potential as bio control agents based on their percentage inhibition of radial growth (PIRG) in dual culture and culture filtrate. The PIRG of F3, F6 and F20 from dual culture are 83.06%, 63.29% and 68.47%. Respectively, the PIRG for culture filtrate for F3, F6 and F20 are 87.76%, 72.08% and 89.33%. Based on PIRG, F3 has the high potential to control *P. palmivora* disease on cocoa.